



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/568,985

02/21/2006

Yukihiro Morita

504780100

3592

52044

7590

10/21/2008

SNELL & WILMER L.L.P. (Panasonic)

600 ANTON BOULEVARD

SUITE 1400

COSTA MESA, CA 92626

EXAMINER

VAZQUEZ, ARLEEN M

ART UNIT

PAPER NUMBER

2829

MAIL DATE

DELIVERY MODE

10/21/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/568,985	Applicant(s) MORITA ET AL.	
	Examiner ARLEEN M. VAZQUEZ	Art Unit 2829	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 October 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10, 13, 14 and 26-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10, 13, 14 and 26-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 April 2008 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>07/25/2008</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments see pages 9-12 and 14-19, filed on 10/03/2008, with respect to claims 1, 5, 9 and 13 have been fully considered and are persuasive. The Final Rejection of 07/09/2008 has been withdrawn.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-13, 26-27 and 29-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over ***Hamamura et al. (US 6,303,932)*** in view of ***Brust (US 5,260,648)***.

As to claims 1-2, 5-6, 9, 13 and 26, ***Hamamura et al.*** discloses in Figure 1 an insulating film measuring device for evaluating properties of an insulating film on a conductive substrate (7, Col. 7 Ins 24-25), the insulating film measuring device comprising an ion irradiating unit (2) configured to irradiate the insulating film (7) with ions (3); a voltage applying unit configured to apply a negative voltage (Col. 7 Ins 44-46) to the insulating film (7) during ion irradiation, but ***Hamamura et al.*** fails to disclose an spectrum measurement unit configured to measure a spectrum of secondary electrons emitted from the insulating film during ion irradiation and/or ion irradiation has

Art Unit: 2829

stopped, wherein the spectrum measurement unit measures, over time, the spectrum of secondary electrons emitted from the insulating film.

However, **Brust** discloses in Figures 4 and 6a-6b an spectrum measurement unit (SPA) configured to measure a spectrum of secondary electrons (SE) emitted from the specimen (IC) during ion irradiation and/or ion irradiation has stopped, wherein the spectrum measurement unit measures, over time, the spectrum of secondary electrons emitted from the insulating film (the SPA measures the spectrum based on frequency, intensity and time).

It would have been obvious for one ordinary skill in the art at the time the invention was made to modify the teachings of **Hamamura et al.** by having a spectrum measurement unit as taught as **Brust** to analyze different characteristics of the insulating film to assure a good quality.

As to claims 3-4,7-8,10, **Hamamura et al.** discloses everything above but fails to teach a variation detection unit detecting, based on a secondary electron spectrum measurement result measured over time by the spectrum measurement unit, at least one of an amount of variation of a rise position of a peak due to kinetic emission of secondary electrons and a rate of variation of the rise position, an intensity detection unit configured to detect detecting, based on a spectrum measured by the spectrum measurement unit, an intensity of a peak appearing at a lower energy level than a peak due to kinetic emission of secondary electrons and a determining unit determining, after ion irradiation has stopped, based on the spectrum measured by the spectrum measurement unit, an energy difference between a first peak due to kinetic emission of

Art Unit: 2829

secondary electrons measured during ion irradiation and a second peak appearing at a lower energy level than the first peak.

However, **Brust** discloses in Figures 4 and 6a-6b a variation detection unit, an intensity detection unit and a determining unit included in Spectrum Analyzer (SPA) which can detect automatic variation in peaks of the emission of secondary electrons (SE) over time and frequency, also detecting variations in energy and intensity (Col. 8 In 49- Col. 9 In 14).

It would have been obvious for one ordinary skill in the art at the time the invention was made to modify the teachings of **Hamamura et al.** by having a variation unit, an intensity unit and a determining unit as taught as **Brust** to analyze different characteristics from the secondary electrons emitted from the insulating film to determine faults or malfunctioning of the insulating film to avoid poor quality.

As to claims 27 and 30, **Hamamura et al.** discloses in Figure 1 means (5) for applying a vacuum to the insulating film (7) during the measurement of the spectrum of secondary electrons (8) and wherein the ion irradiating unit (2) irradiates argon ions (Col. 14 Ins 18-22).

As to claims 29 and 31, **Hamamura et al.** discloses everything above but fails to teach a variation detection unit connected to the spectrum measurement unit to measure a conveyance time, T1 and a shift amount change in E, wherein conveyance time, T1, is a time period from starting an irradiation measurement to convergence of a rise position of a subsequent measurement and change in E is the amount of energy, eV, during T1 and means for measuring a shape of low energy level secondary electron

Art Unit: 2829

peaks in one of during ion irradiation and after ion irradiation wherein intensity, position and shape of the low energy level secondary electron peaks correlated with a capability of the insulating film to emit secondary electrons.

However, **Brust** discloses in Figures 4 and 6a-6b a variation detection unit connected to the spectrum measurement unit (the variation detection unit is integrated in the SPA) which can detect automatic variation in peaks of the emission of secondary electrons (SE) over time and frequency, also detecting variations in energy and intensity (Col. 8 ln 49- Col. 9 ln 14) as well as position and shapes based on the energy levels of the secondary electrons (SE) as shown in Figures 6a and 6b.

It would have been obvious for one ordinary skill in the art at the time the invention was made to modify the teachings of **Hamamura et al.** by having a variation unit connected to the spectrum measurement unit as taught as **Brust** to analyze different characteristics from the secondary electrons emitted from the insulating film to determine faults or malfunctioning of the insulating film to avoid poor quality.

4. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Hamamura et al. (US 6,303,932)** in view of **Brust (US 5,260,648)** further in view of **Nakanishi et al. (US 5,834,791)**.

As to claim 14, the combination of **Hamamura et al.** in view of **Brust** discloses everything above but fails to teach the electron density of states is measure in valence bands of the insulating film. However, **Nakanishi et al.** in Figure 3 the electron density of states is measure in valence bands (Graph of Figure 3 shows how the energy of the

Art Unit: 2829

electrons are represented by valence bands, Col. 9 ln 64- Col. 10 ln 8) of the insulating film (16).

It would have been obvious for one ordinary skill in the art at the time the invention was made to modify the combined teachings of *Hamamura et al.* and *Brust* by having the density of the electrons measure in valence bands as taught as *Nakanishi et al.* to allow graphic representation of the electrons.

5. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Hamamura et al. (US 6,303,932)* in view of *Brust (US 5,260,648)* further in view of *Fries (US 6,764,796)*.

As to claim 28, the combination of *Hamamura et al.* in view of *Brust* discloses everything above but fails to teach wherein the insulating film is MgO. However, *Fries* discloses in Figure 2 wherein the insulating film (35) is MgO.

It would have been obvious for one ordinary skill in the art at the time the invention was made to modify the combined teachings of *Hamamura et al.* and *Brust* by having an insulating film of MgO as taught as *Hamamura et al.* to prevent damage to the substrate from ions and to allow the device to operate at lower voltages.

Prior Art

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Art Unit: 2829

Nakagawa et al. US 4,874,460; Gerlach et al. US 6,949,756; Kouno et al. US 5,233,291; Rengarajan et al. US 2003/0032207; Kolachina et al. US 2005/0012512 and Fuji et al. US 5,574,280.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arleen M. Vazquez whose telephone number is 571-272-2619. The examiner can normally be reached on Monday to Friday, 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ha Nguyen can be reached on 571-272-1678. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. M. V./

Examiner, Art Unit 2829

10/15/2008

Application/Control Number: 10/568,985
Art Unit: 2829

Page 8

/Ha T. Nguyen/

Supervisory Patent Examiner, Art Unit 2829